



U.S. Department  
of Veterans Affairs



# VA EHR Strategic Options Assessment Briefing

*May, 2017*

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# Assessment Highlights

The Department of Veterans Affairs (VA) engaged Grant Thornton to assess four strategic options for modernizing its Electronic Health Record (EHR)

<b>Option 1: COTS</b>	<ul style="list-style-type: none"><li>Adopting a Commercial-of-the-shelf (COTS) product where VA hosts the solution in a VA purchased, federally certified, secure cloud environment</li></ul>
<b>Option 2: COTS + eHMP / JLV</b>	<ul style="list-style-type: none"><li>Adopting a COTS product with Electronic Health Management Platform (eHMP) and the Joint Legacy Viewer (JLV); VA hosts the solution in a VA purchased, federally certified, secure cloud</li></ul>
<b>Option 3: Commercialized Vista</b>	<ul style="list-style-type: none"><li>Providing a gold standard Vista version to a vendor to modernize and provide back to VA as a Software as a Service (SaaS), where the vendor hosts the solution in a federally certified, secure cloud, and provides discounted licensing</li></ul>
<b>Option 4: COTS SaaS</b>	<ul style="list-style-type: none"><li>Adopting a COTS product for the EHR where the vendor hosts the solution in a federally certified, secure cloud, and VA licenses software use</li></ul>

## Highlights from the Assessment:

- The market does address VA's EHR needs with limited variability in cost across the four options
- Key differentiators between the options include the benefits of software ownership, and degree of influence and autonomy VA can exercise in EHR development and data access
- The strategic choice will need to balance VA's appetite for risk against the benefits, costs and strategic alignment
  - Option 3 (Commercialized Vista) is the least expensive option but carries the greatest risk in appropriate and willing available vendors (e.g., maturity of vendor, economic return)
  - Option 2 (COTS + eHMP/JLV) is the most expensive option and is less aligned with OI&T's strategic priorities (e.g., buy first, reduce IT footprint), yet can enable tailoring
  - Option 1 (COTS) and Option 4 (COTS SaaS) cost the same and primarily vary in (a) the control and flexibility VA will have to integrate new solutions as they emerge in the market, (b) the responsibility for hosting, which requires IT investment and skills

# Trade-off Analysis – Clinical Summary

COTS vendors provide modern systems that meet multiple interoperability standards. VA retains more flexibility for future applications when it owns and administers the cloud; and, has the highest degree of tailorability when it designs all or part of the software. The relative importance of these criteria inform the strategic decision.

Decision Factor	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized VistA	Option 4: COTS SaaS
<b>Interoperability with other health systems</b>	<ul style="list-style-type: none"> <li>Top tier vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS. Also, JLV provides a static view of external records</li> <li>eHMP to provide longitudinal record</li> </ul>	<ul style="list-style-type: none"> <li>Capability would be built into the commercialized VistA solution</li> </ul>	<ul style="list-style-type: none"> <li>Top tier vendors meet multiple interoperability standards (e.g., FHIR) to create longitudinal record</li> </ul>
<b>Modernity</b>	<ul style="list-style-type: none"> <li>Leading software that upgrades with industry best practices and innovation; includes modern team based communications</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS</li> <li>eHMP functionality would need to be de-conflicted of overlapping capability and then integrated with the COTS product</li> </ul>	<ul style="list-style-type: none"> <li>Vendor's commitment to continuous upgrade contingent on ability to sell into the market</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>VA administered cloud increases VA flexibility to access 3rd party vendors (e.g., best in class population health) and data</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS</li> <li>eHMP for new capabilities developed over time which may exceed pace that market innovates</li> </ul>	<ul style="list-style-type: none"> <li>Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) as vendors may have pre-existing agreements.</li> </ul>	<ul style="list-style-type: none"> <li>Vendor administered cloud decreases VA flexibility to access 3rd party vendors (e.g., best in class population health) as vendors may have pre-existing agreements.</li> </ul>
<b>Tailorability</b>	<ul style="list-style-type: none"> <li>Software configuration to meet end-user practice preference (e.g., physician note templates)</li> <li>Code level change (customization) incurs additional cost</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS</li> <li>eHMP adds capability to tailor because it is a VA developed and managed product</li> </ul>	<ul style="list-style-type: none"> <li>Highest level of tailorability</li> <li>May require additional cost to purchase leading business and clinical workflows from 3rd party entities</li> </ul>	<ul style="list-style-type: none"> <li>Same as Option 1: COTS except code level change (customization) may not be possible due to shared software with other clients (e.g., DoD)</li> </ul>

# Trade-offs Analysis – Technology, Time, Risk & Cost

COTS solutions carry less risk as they are routinely implemented and run in the market, both on and off premises. More extensive tailoring increases cost or time for implementation. While Options 3 and 4, meet all IT priorities, they trade off some flexibility for VA in choosing downstream applications.

Decision Factor	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized VistA	Option 4: COTS SaaS
<b>IT Strategic Alignment</b>	<ul style="list-style-type: none"> <li>Aligns with all the strategic priorities except cloud is VA administered</li> </ul>	<ul style="list-style-type: none"> <li>Does not align with the following strategic priorities: buy first, reduce IT footprint because eHMP is VA developed</li> </ul>	<ul style="list-style-type: none"> <li>Aligns with all IT priorities</li> </ul>	<ul style="list-style-type: none"> <li>Aligns with all IT priorities</li> </ul>
<b>Time to Initial Operating Capability (IOC)</b>	<ul style="list-style-type: none"> <li>Out-of-the-box functionalities fulfilling &gt;80% of VA's needs</li> <li>Estimate 18-24 months to IOC ~ Pilot Site post acquisition</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-the-box functionalities fulfilling &gt;80% of VA's needs</li> <li>Additional time to re-design and scale eHMP to COTS solution</li> <li>Estimate 18-24 months to IOC ~ Pilot Site post acquisition**</li> </ul>	<ul style="list-style-type: none"> <li>Requires modernizing a single instance of VistA software prior to implementing, which will add at minimum an additional 12 months</li> <li>Estimate 24-36 months to IOC ~ Pilot Site post acquisition</li> </ul>	<ul style="list-style-type: none"> <li>Out-of-the-box functionalities fulfilling &gt;80% of VA's needs</li> <li>Estimate 18-24 months to IOC ~ Pilot Site post acquisition</li> </ul>
<b>Relative Risk</b>	<ul style="list-style-type: none"> <li>Medium risk since vendors implement their solutions in this manner routinely</li> </ul>	<ul style="list-style-type: none"> <li>Higher risk due to continued reliance on internally developed software</li> </ul>	<ul style="list-style-type: none"> <li>High risk due to limited partner viability or appetite</li> </ul>	<ul style="list-style-type: none"> <li>Medium risk since vendors have SaaS models in place</li> </ul>
<b>15-Year Cost Estimate*</b>	\$16,234,994,160	\$18,740,799,583	\$11,992,747,674	\$16,066,009,238

\*15-Year Cost Estimate contains the 10 year implementation timeframe, plus five years of post-implementation sustainment.

\*\*eHMP re-design and scaling effort may increase time to IOC.

# Next Steps

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We recommend the following next steps:

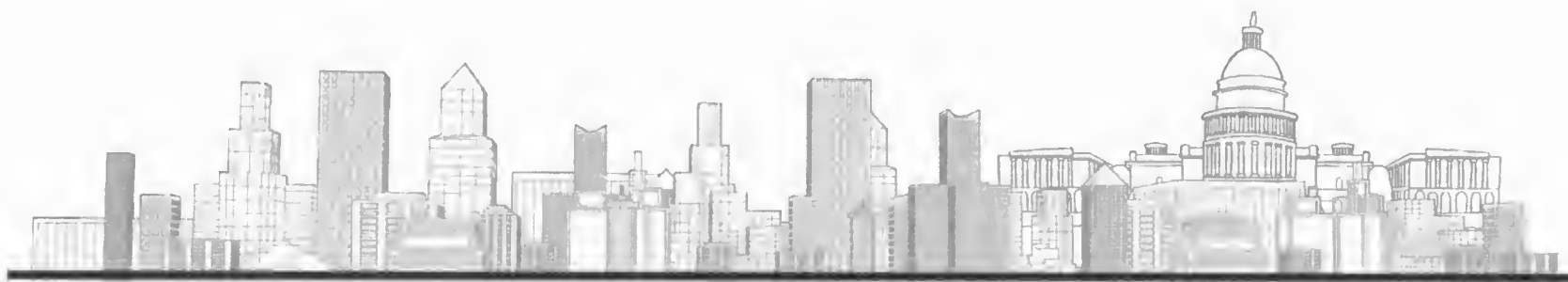
- Facilitated discussion with VA leaders to validate and prioritize decision criteria and evaluate against success at year 1 and year 10.

Clinical / Operational:

- Formally **document and prioritize desired EHR capabilities** clinicians would like to see in the next 3-5 years in a modernized EHR (e.g., video conferencing capabilities with Veteran on her PDA, receiving Veteran's vitals remotely before he arrives to the clinic)
- Establish a **communications strategy** that includes the design of a communications infrastructure that proactively anticipates and addresses internal and external concerns to maximize cooperation and understanding

Technology:









- Conduct a **technical readiness assessment** that includes testing VA's network infrastructure, bandwidth and other technical capabilities to support the technology requirements of a modernized EHR system either in a cloud or SaaS environment
- Conduct a **system (application) and hardware inventory** including end-user devices such as computers, tablets, etc. across each and every clinical location to ensure all software and hardware is catalogued to evaluate future plans (upgrade, maintain or decommission) and understand interface requirements with the new EHR



# Appendix

# Summary of Qualitative Findings

The four strategic options have differentiated benefits, risks and alignment with IT strategic priorities. VA must assess the relative value it places in these strategies and benefits, and the relative importance of each risk in identifying the optimal solution.

























Evaluation Factors	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized VistA	Option 4: COTS SaaS
<b>Clinical Priorities</b>				
<b>IT Strategic Direction</b>				
<b>Benefits</b>	High	High	High*	High*
<b>Risk</b>	Medium	High	High	Medium





\*Rating assumes VA inserts appropriate language into the contract to guarantee access to and control of data as well as ability to connect third-party software at will. This may increase cost to VA.



# Strategic & Cultural Fit

Review of multiple EHR vendor product demonstrations suggested that COTS vendors have current capabilities within their out-of-the-box functionalities to meet majority if not all of VHA's clinical priorities.





































Clinical Priorities	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized VistA*	Option 4: COTS SaaS
Addresses features unique to VA				
Workflow				
Team-based care				
Analytics and research				
Mental health				
Interoperability with DoD and community providers				





 Complete
  Limited
  Partial
  Not Aligned

\*Assumes the modernized, Commercialized VistA is based on a single, "best of breed" instance of VistA.

# Functionality & Technology

Options 1, 3, and 4 almost fully align with VA's IT strategic direction. Option 1 (COTS) has some reliance on existing IT resources to support the hosting setup. Option 2 (COTS + eHMP) on the other hand, has limited alignment primarily because it relies heavily on VA resources for the hosting setup and also for the internal development to support and advance the eHMP.

Technology Priorities	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized Vista	Option 4: COTS SaaS
Single-view of the Veteran and data management				
Strategic sourcing				
Buy-first approach				
Reduced IT footprint				
Cloud-based				
Additional Evaluation Criteria				
Network resource requirements				
Adaptability				
Scalability				
Redundancy				

 Complete
  Partial
  Limited
  Not Aligned

# Benefits

The relative value of each benefit to VA leadership is a critical dimension to assessing each option against one another from a benefits perspective. While it may be natural to simply tally highly rated benefits, they may not hold the same importance to VA. Each benefit and option must be assessed individually as well as collectively to understand how they drive the decision.

Benefit Category	Evaluation Criteria	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Commercialized VistA	Option 4: COTS SaaS
Defined product roadmap	<ul style="list-style-type: none"> <li>Clear vision for software evolution</li> <li>Ability to keep pace with market demands, trends and innovations</li> </ul>	High	Medium	Low	High
Access to and ownership of data	<ul style="list-style-type: none"> <li>VA has direct administrative and/or system authority</li> </ul>	High	High	Low*	Low*
				High*	High*
Ability to customize EHR product	<ul style="list-style-type: none"> <li>VA has the ability to direct product development</li> </ul>	Medium	High	High	Low

\*This benefit is traditionally low as the vendor controls the environment in which the software is hosted, and can therefore control how and whether other systems can connect. VA can mitigate this however, by ensuring appropriate language in the contract guaranteeing ability to connect software of VA's choosing. This may add cost to VA.

# Risks

Similarly to the benefit analysis, it is important not to simply tally the assessed risks, but to analyze each risk separately to understand the relative importance of the risk and whether it is an acceptable risk for the agency to take. These risks can then be balanced against alignment with strategy, benefits and costs to find the best strategic option for VA.

Risk Category	Evaluation Criteria	Option 1: COTS	Option 2: COTS + eHMP	Option 3: Comm. VistA	Option 4: COTS SaaS
<b>Transitioning to a cloud environment</b>	<ul style="list-style-type: none"> <li>Experience with cloud</li> <li>Resource skillset</li> </ul>	High	High	High	Medium
<b>Backup and disaster recovery management (DRM)</b>	<ul style="list-style-type: none"> <li>Infrastructure reliability</li> <li>Redundancy protocols in place</li> </ul>	High	High	Low	Low
<b>Integration of third-party COTS applications</b>	<ul style="list-style-type: none"> <li>COTS capabilities can address VHA's needs (e.g., population health, mental health)</li> </ul>	Low	Low	Medium	Medium
<b>Loss of control over future EHR capabilities development*</b>	<ul style="list-style-type: none"> <li>VA's level of autonomy and control over its future EHR solution</li> </ul>	High	Medium	Low	High
		Medium			Medium
<b>Demand on network infrastructure</b>	<ul style="list-style-type: none"> <li>Relative bandwidth requirement at the VAMC and satellite facilities</li> </ul>	Medium	High	Medium	Medium
<b>Required additional development</b>	<ul style="list-style-type: none"> <li>Maturity of software and its capabilities</li> </ul>	Low	High	High	Low
<b>Disruption to workflow during implementation</b>	<ul style="list-style-type: none"> <li>Clinical workflows and business processes will be redesigned</li> </ul>	High	High	High	High
<b>Availability of Vendors</b>	<ul style="list-style-type: none"> <li>The known availability of vendors in the market that can support the option</li> </ul>	Low	Low	High	Low

\*Traditionally, this risk is high as commercial vendors control the product roadmap. VA however could reduce this risk by contractually requiring some control over the direction the vendor takes with the product. The additional control would likely incur additional costs for VA.

# Assumptions

## General Assumptions

- EHR will be implemented in a Digital Health Platform environment that enables interoperability among disparate systems and devices.
- The following cost categories have been excluded from the cost analysis:
  - Decommissioning of VistA
  - Internal VA/VHA/OI&T staffing costs
- VA will not buy additional or specialized hardware for EHR implementation.
- Assessment is based on strategic needs, not detailed functional and non-functional requirements.
- Industry benchmarks related to EHR adoption apply:
  - Healthcare Financial Management Association (HFMA) cost breakouts are generally applicable with some VA-specific modifications due to less hardware need.
- COTS vendors are all willing to configure their products to meet VA's enterprise needs.
- VA will maintain ownership of all clinical data related to Veteran healthcare.
- All cloud providers, whether VA provisioned or SaaS, are HIPAA and FEDRamp High compliant.

## Option-Specific Assumptions

- **Option 2:** eHMP can be made to be compatible with a COTS solution. We assume that the future eHMP will possess functionality lacked by COTS solution.

# Guiding Principles

## Business Principles

- Veteran safety and quality care are not compromised during EHR transition.
- A modernized EHR supports Veteran-centric, quality-driven, data-driven, evidence-based, and team-based care.
- Clinical priorities drive EHR functional needs. IT trends and disruptive innovations can enable/inform EHR system functions. Requirements are driven by stakeholder principals (e.g., clinician, researcher, care team).
- EHR standardization is balanced with managed configurability.
- A modern EHR is adaptive to current and future health care trends, as well as IT/digital transformation trends.
- EHR incorporates integrated (across care settings, e.g., surgery, operating room, emergency dept., intensive care, outpatient clinics, inpatient, long-term care, mental health, virtual care modalities) and longitudinal view of Veteran data.
- Decisions are optimized for VA and achieve economies of scale.
- Innovation and agility are non-negotiable.

## Operational Principles

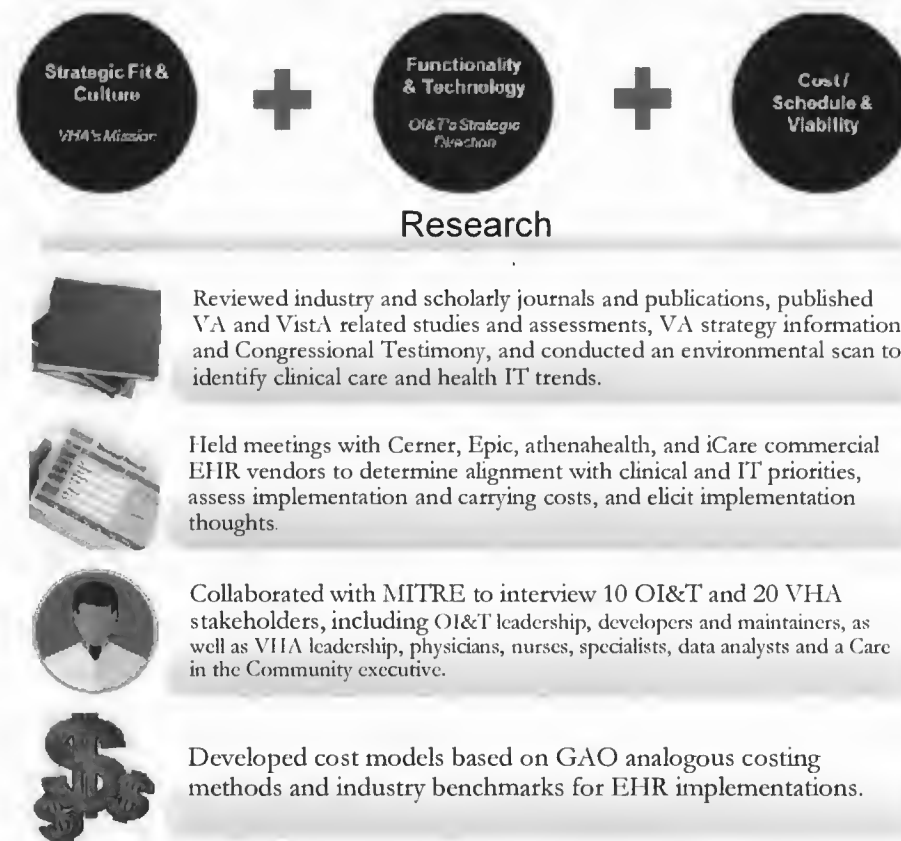
- Change management, standardization of clinical processes (including business process reengineering) and data are critical to the success of EHR modernization.
- EHR modernization is minimally disruptive to hospital and clinic operations.
- Legacy VistA EHR represents the baseline. Consequently, clinical excellence cannot regress as a result of IT changes during EHR modernization.
- VA leverages EHR lessons and best practices from organizations with similar delivery models (e.g., Kaiser, DoD, Mayo Clinic).

## Architecture /Engineering Principles

- EHR systems are architected from a system-of-systems perspective, optimizing system quality (e.g., reliability, scalability, maintainability, usability, etc.).
- EHR system should promote open architecture and standards so that clinical tools remain available to public and private sector providers.
- In addition to standardized business processes, EHR will incorporate common data/information model, taxonomy and standardized terminologies.
- Data is an asset. Data integrity and quality are always sustained. There is zero tolerance for data loss during transition to a modern EHR system.
- EHR is designed and implemented to enhance seamless interoperability with DoD and community providers, and establish collaborative partnerships.

# Analysis Framework & Approach

In evaluating the four strategic options, Grant Thornton leveraged our strategic evaluation framework for adoption of new enterprise technologies, which is comprised of Strategic Fit and Culture; Functionality and Technology; and Cost/Schedule and Viability



# VHA and OI&T Stakeholder Analysis

## Clinical

### Communication and Coordination Tools are Necessary

- VHA representatives articulated a need for better communications tools to support care coordination among the care (PACT) team, with community providers and with Veteran patients.

### Analytics and Measurement

- The general feedback is that VistA provides an excellent capability for enterprise analytics, but at the clinician level does not provide the capability to perform data analysis to support care delivery.

### Organizational Readiness

- While clinicians personally expressed eagerness for a change, they are concerned with organizational preparedness and capability to manage the change to a new system.

### Culture

- Clinicians expressed satisfaction with the level of customization locally with VistA, which is not possible with a new system.
- There is some concern that the change will drive retirement eligible staff towards leaving to avoid having to go through a complex change to a new EHR.

### Package/Specialty Level Concerns

- Stakeholders expressed need for a solution that meets VA's needs more fully in:
  - Pharmacy
  - Community Care/Revenue Cycle
  - Labs
  - Mental Health

## Technology

### Concerns Regarding Technological Readiness

- Network Capacity
- Lack of in-house skills for moving to the cloud

### Ability to Meet VA-Specific Needs

- COTS solutions will not address Veteran specific issues as well

### Solution Must Support Standardization of Care

- Data management must support care delivery
- Decision support currently works, but is not standardized across the agency
- Mobile health is critical to success
- Veterans must have a central place to manage their health

### General Concern with VistA Modernization

- VA has not invested in VistA as it should have over past ten years
- VA looked to contractors with less experience in MUMPS and VistA, which made modernization more difficult



# Clinical and Technical Priorities

## Clinical

### Care Approaches Unique to VA

- Configuration required to address Federal requirements while serving a unique population base (e.g., pharmacy, tele-health, mental health)

### Workflow

- Single location for Veteran information – whether VA or community generated records.
- Improved tele-health, mobile and web-based tools/technologies for managing Veteran care
- Scheduling ease for Veterans and providers

### Team-based care / PACT

- Improved care coordination
- Improved communication tools
- Management of Veteran cohorts – supporting Veteran groups with similar health concerns

### Analytics / Research

- Clinical decision and cognitive analytics support - care for an individual Veteran
- Population health - leveraging large data sets to improve care for groups
- Performance improvement - tracking outcomes between VA facilities/regions
- Ability to easily access data for clinical and research purposes

### Mental health

- Seamless integration of mental health into EHR

### Interoperability

- Seamless bi-directional exchange of data with DoD, community providers, etc.

## Technology

### Strategic

- Buy-first approach
- Cloud-based
- Reduced IT footprint
- Interoperable with VistA, COTS, DoD, community providers
- Data is standardized for management purposes
- Single-view of Veteran and data management
- Utilization of strategic sourcing methods
- Integration with VA cyber-security strategies

### Operations

- Reduce barriers to improve worker productivity
- Clinician input in EHR design
- VA maintains ownership of its data
- Internal network (LAN) capacity to meet data traffic
- Broadband (high-speed, high bandwidth) internet availability
- Integration of non-EHR VistA components

# Estimated Implementation Timeline

Grant Thornton selected a ten year implementation timeline due to the size and complexity of VA. This would allow adequate planning and preparation time, as well as time for appropriate alpha and beta testing prior to full roll out.

Our assumed timeline includes appropriate planning for the following:

- 12-18 months for preparation, planning and Project Management Office (PMO) stand-up for the implementation
- Beta test at one facility for the next 12-18 months to deploy the future Health IT/EHR in VA:
  - Capture clinical and business requirements and standardize workflows across the facility
  - Translate clinical data and design requirements to technical specifications required for build
  - Map standard reporting capabilities to clinical and operational requirements and develop custom reports as appropriate
  - Develop a robust testing methodology to including testing data flow across vendor and VA applications and outside in the community
  - Conduct integrated clinical use case testing, including regression and community connections
  - Conduct training of clinical and operational end users
  - Determine appropriate support for activation and deployment activities
- Alpha test for 12-24 months that includes expansion to other facilities in the beta site Veteran Integrated Service Network (VISN), and additional facilities in other VISNs to control for VISN variability
  - Confirm lessons learned based from the beta site on clinical adoption and interoperability with community providers utilizing Agile methodologies
  - Conduct user review and acceptance analysis of standardized clinical and business processes developed and implemented at the beta test site
  - Determine key drivers for the time duration would be deployment of standardized clinical workflow, training and testing
- Begin national rollout of the implementation phase.

Year	1	2	3	4	5	6	7	8	9	10
# of Hospitals	0	1	7	10	25	25	25	25	25	25